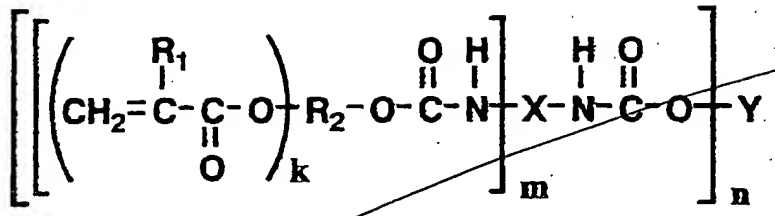

wherein R_1, X and k have the meanings given above; Y is a polyhydric alcohol group; m is an integer of 1 or 2; and n is an integer of 1 to 6, with the proviso that k, l, and m cannot all be 1.

REMARKS

All the claims submitted for examination in this application have been rejected on formal and/or substantive grounds. Applicants have amended their claims and respectfully submit that all the claims currently in this application are patentable over the rejection of record.

The sole formal ground of rejection is limited to Claim 2. Claim 2 stands rejected, under 35 U.S.C. §112, second paragraph, as being indefinite. The basis for this ground of rejection resides in the alleged failure of Claim 2 to be directed to the subject matter of Claim 1, from which it depends. That is, Claim 1 requires that the hard coat layer consists of a polymer polymerizing a (metha)acrylate compound having a fluorene structure. The polymer of Claim 2 is a copolymer copolymerizing a urethane(metha)acrylate compound. Indefiniteness is thus predicated upon the failure of Claim 2 to be directed to the subject matter of Claims 1, from which it depends.

Applicants have amended Claim 1 to introduce therein the limitation of Claim 2. This amendment to Claim 1 removes any indefiniteness present in original Claim 2, which has

been cancelled. As amended, the hard coat layer of Claim 1 is now recited to comprise a copolymer copolymerizing at least one (metha)acrylate compound having a fluorene structure and a urethane(metha)acrylate compound. Stated differently, the hard coat layer recited in amended Claim 1 comprises a copolymer whose identity is clearly set forth. In any event, the rejection of Claim 2 is moot insofar as Claim 2 has been cancelled.

Three substantive grounds of rejections are imposed in the outstanding Official Action. The first of these is directed to Claims 2, 6-10 and 12. These claims stand rejected, under 35 U.S.C. §102(b), as being anticipated by U.S. Patent 5,747,152 to Oka et al.

The Official Action, based on alleged ambiguity between Claims 1 and 2, assumes that the hard coat layer of Claim 2 comprises a copolymer of at least a urethane methacrylate compound that does not require a fluorene structure. As amended, Claim 1 is restricted to a (metha)acrylate compound having a fluorene structure and a urethane(metha)acrylate compound. As such, the assumption made in the anticipation rejection of Claim 2, which is amended Claim 1 in independent form, over Oka et al. is made moot with the instant amendment to Claim 1.

Without addressing, at this point, all the grounds, imposed in Paragraph 7 of the Official Action, in support of the allegation that Oka et al. anticipates all the limitations of all the claims subject to this ground of rejection, applicants respectfully submit that amended Claim 1 includes the requirement that the hard coat layer comprise a copolymer of a methacrylate compound having a fluorene structure and a urethane(meth)acrylate compound. Insofar as Oka et al. does not disclose an anti-reflection material which includes a hard coat layer which comprises a (metha)acrylate compound having a fluorene structure and a urethane(metha)acrylate compound, this ground of rejection is unavailing.

The teaching of Oka et al. includes a polymer with a fluorine atom (Column 30, lines 22-35). Such a compound is, of course, totally removed from a (metha)acrylate-urethane(metha)acrylate copolymer. A polymer having a fluorine atom merely means that it contains an atom of the halogen element fluorine. A compound having a fluorene structure denotes a compound whose configuration has a fluorene structure. Such a structure has nothing to do with the inclusion of fluorine atoms included therein. Indeed, a copolymer of a (metha)acrylate having a fluorene structure and a urethane(metha)acrylate contains no fluorine atoms.

Applicants concede that Oka et al. includes a hard coat layer which comprises a urethane acrylate polymer. However, the Oka et al. hard coat layer copolymer does not have a fluorene structure. The criticality of a fluorene structure, which clearly predicates novelty of the claims of the present application over Oka et al., furthermore establishes patentability of such a claim, under 35 U.S.C. §103(a), over Oka et al.

Attention is directed to Table 1, at Page 58 of the instant specification, wherein it is shown that the anti-reflection materials of Examples 1 to 10 include a hard coat layer which comprises a copolymer of at least a (metha)acrylate compound having a fluorene structure and a urethane(metha)acrylate compound. These materials demonstrate superior reflectance, wear resistance, chemical resistance, critical surface tension, contamination resistance, light resistance and image contrast.

In contrast, Comparative Examples 1 and 4, which contain a urethane copolymer which does not comprise a (metha)acrylate compound having a fluorene structure as one of its comonomers is shown to have excessive reflectance and inferior image contrast. Comparative Example 2 is characterized by excessive reflectance, inferior image contrast and excessive

critical surface tension. Comparative Example 3 is denoted by excessive reflectance, inferior wear resistance and inferior chemical resistance.

The major distinction between the comparative examples, Comparative Examples 1 to 4, and Examples 1-10, within the scope of the amended claims of the present application, is the presence of a (metha)acrylate compound having a fluorene structure as one of the monomers of the copolymer. None of the polymers that constitute the hard coat layer of Oka et al. includes a monomer which is a (metha)acrylate having a fluorene structure.

It is furthermore noted that Examples 1 to 10 are even superior to Examples 11 to 13. Examples 11 to 13, although superior to the comparative examples, are within the contemplation of original Claim 1, which, in effect, has been cancelled by incorporation therein of the limitation of original Claim 2. Original Claim 1 was limited to a (metha)acrylate compound having a fluorene structure but not a copolymer of a (metha)acrylate compound having a fluorene strucure and urethane(metha)acrylate.

The above remarks, however, apply to the rejection of original Claim 2. Claim 6, from which Claims 7 and 8 depend, has been cancelled and replaced by new Claim 13. Claim 13 is a second embodiment of the anti-reflection material of the present invention. That material includes a transparent substrate, a hard coat layer provided on one surface or two surfaces of the transparent substrate, directly or via another layer, and an anti-reflection film consisting of one or multiple layers having an adjusted reflective index. The hard coat layer of this second embodiment, as defined in Claim 13, includes ultrafine particles having a high refractive index and a polymer of a urethane(metha)acrylate compound having one of the two chemical formulae set forth therein.

Suffice it to say, there is no disclosure in Oka et al. of the urethane(metha)acrylate compound having one of the two formulae set forth in new Claim 13. It is noted in passing that support for the new limitation of the two formulae added to Claim 13 is provided in the originally filed specification at Page 22, line 9 to Page 23, line 7. Neither of the urethane(metha)acrylate monomers, defined by these formulae, are disclosed or employed in the Oka et al. product.

It is furthermore noted that the anti-reflecting material of new Claim 13, from which each of Claims 7-9 depend, is not subject to any ground of rejection other than the anticipation rejection over Oka et al. It is thus unnecessary to provide further comments directed to that claim other than to indicate that Examples 15 to 22 provide superior anti-reflection materials to those of Comparative Examples 5 to 8. The hard coat layer of Examples 15 to 22 includes a urethane acrylate of the type generically set forth in Claim 13, a urethane(metha)acrylate. In Comparative Examples 5-8 the hard coat layer is not formed from urethane(metha)acrylate at all. Rather, that prior art exemplification utilizes a polyester resin.

Turning now to Claims 10 and 12, which are also alleged to be anticipated by Oka et al., those claims are novel over the teaching of Oka et al. At the outset, it is noted that Claim 10 has been amended to broaden the hard coat layer to one which includes, rather than consists of, at least one radiation and/or thermosetting resin and titanium oxide ultrafine particles surface-treated oxide or hydroxide of one of five elements.

It should be appreciated that the Markush group language of Claim 10 has been amended to correct its obvious misstatement. It is also noted that there was a typographical

error in Claim 10 which has also been removed by the deletion of the word "by" in the penultimate line thereof.

Speaking of amendments, Claim 12 has been amended to remove the multiple dependency of that claim. As amended, Claim 12 depends exclusively from Claim 10.

The requirement in Claim 10 that the titanium oxide ultrafine particles be surface treated with at least one element selected from the group consisting of silicon, zirconium, aluminum, tin and cesium distinguishes that hard coat layer from that disclosed in Oka et al. No disclosure is made therein of surface treatment with an oxide or hydroxide of any of the five elements recited in Claims 10 and by Claim 12, based on its dependency from Claim 10. It should be understood that that surface treatment enhances bond strength between the ultrafine particles and the binder resin (Column 12, lines 36-49.) Thus, the absence of such a teaching in Oka et al. not only establishes the novelty of Claims 10 and 12 but the unobviousness of those claims as well.

The second substantive ground of rejection is directed to Claims 1 and 3-5. Claims 1 and 3-5 stand rejected, under 35 U.S.C. §103(a), as being unpatentable over Oka et al. in view of Japanese Patent Application 08-056398 to Kawasato et al.

It is noted in passing that the application of the second ground of rejection emphasizes the weakness of the first ground of rejection, the anticipation of Claim 1 by Oka et al. The application of a second reference, Kawasato et al., introduces the teaching, which the Official Action admits that Oka et al. does not teach, of an anti-reflection material which includes a hard coat layer which comprises a methacrylate having a fluorene structure.

Turning to the merits of this second substantive ground of rejection, the combined teaching of Oka et al. and Kawasato et al. does not make obvious Claims 1 and 3-5. The anti-

reflection material of those claims include a hard coat layer of a copolymer of a (metha)acrylate having a fluorene structure and a urethane(metha)acrylate. The combined teaching of Oka et al. and Kawasato et al. comprises a hard coat layer of a copolymer of a (metha)acrylate having a fluorene structure. That copolymer does not disclose or suggest the inclusion of a urethane(metha)acrylate mononer in its formation.

It is moreover emphasized that the teaching of Kawasato et al. is directed to a coating, not to a comonomer. The acrylate resin of the Kawasato et al. disclosure thus bears no relationship to the use of the copolymer as a hard coat layer of an anti-reflection material.

It is furthermore averred that even if Kawasato et al. was directed to a copolymer of the type claimed as the hard coat layer of the anti-reflection material of Claims 1 and 3-5 still the demonstration of improved results, discussed above, would rebut any presumption of obviousness. It goes without saying, of course, that no such teaching is made by the combined teaching of these references.

The third substantive ground of rejection concerns Claim 11. Claim 11 stands rejected, under 35 U.S.C. §103(a), as being unpatentable over Oka et al. in view of U.S. Patent 4,735,869 to Morita.

The Official Action argues that Morita et al. teaches a process of forming a titanium dioxide optical film which employs a rutile-type titanium dioxide which has a higher refractive index than that of an anatase-type titanium dioxide.

Applicants do not allege that there is anything novel about employing an rutile-type titanium dioxide in an optical film. However, the patentability of Claim 11 is predicated upon the patentability of Claim 10, from which it depends, which is further restricted by its limitation, the inclusion of rutile-type titanium dioxide.

Claim 10 includes the limitation, not taught by either Oka et al. or Morita, of utilizing, as the hard coat layer, a radiation and/or thermosetting resin and titanium oxide ultrafine particle surface-treated oxide or hydroxide of at least one element selected from the group consisting of silicon, zirconium, aluminum, tin and cesium. Since this claimed hard coat layer is not taught by the combined teaching of Oka et al. and Morita, the combined teaching of these references do not make obvious Claim 11, even if Morita teaches the use of a titanium dioxide having a rutile-type crystal structure.

The above amendment and remarks establish the patentable nature of all the claims currently in this application. Notice of Allowance and passage to issue of these claims, Claims 1, 3-5 and 7-13, is therefore respectfully solicited.

Respectfully submitted,

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APPENDIX

RENDITION OF AMENDMENT OF APPLICATION SHOWING CHANGES MADE

Claim 1 (Amended): An anti-reflection material comprising a transparent substrate, a hard coat layer provided on one surface or two surfaces of said transparent substrate directly or via another layer, and an anti-reflection film having a lower refractive index than said hard coat layer further provided on a surface of said hard coat layer, wherein said hard coat layer comprises a copolymer copolymerizing [consists of a polymer polymerizing] at least a (metha)acrylate compound having a fluorene structure and a urethane(metha)acrylate compound.

Claim 3 (Amended): An anti-reflection material as recited in claim 1 [or 2], wherein said hard coat layer comprises [consists of] a filler having a refractive index of 1.6 to 2.7.

Claim 4 (Amended): An anti-reflection material as recited in [one of claims 1 to 3] claim 1, wherein said anti-reflection film has a critical surface tension of 20 dynes/cm [dyne/cm] or less.

Claim 5 (Amended): A polarization film wherein a protecting layer is laminated on the opposite side of the surface of said transparent substrate of said anti-reflection material as recited in [one of claims 1 to 4] claim 1 in which said hard coat layer and said anti-reflection film are provided, via a polarization substrate.

Claim 7 (Amended): An anti-reflection material as recited in claim [6] 13, wherein said hard coat layer has a particle size of 30 nm or less.

Claim 8 (Amended): An anti-reflection material as recited in claim 13 [6] , wherein said anti-reflection film has a critical surface tension of 20 dynes/cm [dyne/cm] or less.

Claim 9 (Amended): A polarization film wherein a protecting layer is laminated on the opposite side of the surface of said transparent substrate of said anti-reflection material as recited in claim 13 [one of claims 6 to 8] in which said hard coat layer and said anti-reflection film are provided, via a polarization substrate.

Claim 10 (Amended): An anti-reflection material comprising a transparent substrate, a hard coat layer provided on one surface or two surfaces of said transparent substrate directly or via another layer, and an anti-reflection film further provided on a surface of said hard coat layer, wherein said hard coat layer comprises [consists of] at least one radiation and/or thermosetting resin and titanium oxide ultrafine particle surface-treated [by] oxide or hydroxide of at least one element selected [chosen] from the group consisting of silicon, zirconium, aluminum, tin[,] and cesium.

Claim 12 (Amended): A polarization film wherein a protecting layer is laminated on the opposite side of the surface of said transparent substrate of said anti-reflection material as recited in claim 10[or 11] in which said hard coat layer and said anti-reflection film are provided, via a polarization substrate.